4 Air Cargo

AQIM Handbook

Contents

Background

The cargo population, or sampling universe, for AQI monitoring is now defined perisable agricultural cargo. Random samples can be taken from this population with more intensive (hypergeometric) inspections completed and necessary data recorded about these commodities.

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the commodity. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, the unit of sampling, and inspection consistency issues.

The Sampling Universe

You estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. The following questions need answers in order select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For cargo AQIM, the sampling universe is defined by a commodity grouping in each of the major cargo pathways such as airplane, ship, or truck. The following commodities or commodity types are **excluded** from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Frozen commodities
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Oil, salt, iron ore, coal, etc., which have no pest risk.

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with PPQ cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. With air cargo, the sampling universe is perisable agricultural cargo. This perisable category is defined as any commercial shipment of fresh fruit or vegetables.

By sampling this category, PPQ is able to get precise estimates of the number of containers with pests approaching or other needed actions. This risk information helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It's very important that each commodity in the category selected be representative of all other units of that category. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (either random time, or random number, etc.). This random selection process eliminates the bias of the officer who is selecting the sample. The officer's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample not representative of the entire

commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up A Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port must individualize its random sampling process. It will be necessary to document the process and possibly ask for feedback from other air cargo ports, regional AQIM coordinators or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Unit of Sampling

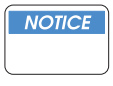
For air cargo, the sample unit is the air waybill. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and any smuggling of prohibited agriculture commodities. Summary inspection procedures for air cargo begin on page 4-5. The procedures must be followed exactly in order for the monitoring estimates to be valid and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all officers must be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of air waybills approaching the work location with pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10 percent or more pest infestation rate. This initial threshold is used to estimate the number of containers approaching a work location with a pest threat.



This 10 percent infestation level may change as the data for AQIM is collected and analyzed

To be 95 percent sure that the officer inspecting the sampled container will find the pest, when the shipment is infested at a 10 percent infestation or more level, the officer must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 4-1: Hypergeometric Table For Random Sampling In Commodity Inspection.** Each of these boxes must be inspected at level of intensity to ensure that:

- No hitchhiker pests are present in the box,
- No internal feeding insects are present in randomly selected fruit in the box, and
- No mismanifested or smuggled items are present.

TABLE 4-1: Hypergeometric Table For Random Sampling In Commodity Inspection

Total Number of Boxes on Air waybill	Number of Boxes to Select at Random From the Air Waybill and to Inspect to Detect Pests
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
886-200,000	29

Officers should follow normal inspection procedures of the commodities to determine pests. For example, officers should cut fruit to detect internal feeders if external evidence is present.

Air Cargo Procedures Summary

AIR CARGO AQIM PROCEDURES	
Commodity	(1) Random Sample of perisable agricultural cargo commodities (non-frozen cargo & excluding pre-cleared cargo)
	Miscellaneous Animal/Meat Meal: all countries - includes blood, bone, hoof, feather meals foodstuffs (PPQ Interest): Pacific Rim
Cargo Population Definition	All air waybills carrying the above category destined to US. This does not include precleared and frozen commodities. Also it does not include commodities with mandatory treatments at port of entry. Note: Commodities with mandatory cold treatments are included.
Sample Size	Two (2) Air Way Bills (AWBs) per week per airport at ALL ports that can sustain this sampling. (excluding cut flowers, precleared and mandatory treatment cargo). **Contact Regional AQIM Risk Mgmt Program Mgr. for assistance.**[1]
Sample Selection	Port discretion, random time, skip intervals, etc. May need to first determine the total number of shipments of a category received at a port in one year.
Inspection Methodology	Each selected shipment requires a physical inspection at port or consignee premise. Boxes for inspection must be taken from random locations throughout the container to detect a 10 percent level of infestation (at 95% confidence). The number of boxes shall be set using **Table 5-1**. Entire contents of boxes selected and available floor space of the container shall be inspected for agricultural pests or mismanifested or smuggled items.
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/ broker/consignee or government as per port management. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

1 Regional AQIM Risk Mgmt. Mgrs: Western Region - Judy Pasek: 970-494-7580 Eastern Region - Calvin Shuler: 919-716-5591

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to Appendix L. Pathway Monitoring Maintenance in the AQIM Handbook. This appendix contains a checklist of questions

port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. **See Figure E-1**. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Air Cargo Worksheet

There is one worksheet for recording information gathered from your inspection of air cargo for the purpose of AQIM. Be sure to properly record the commodity being inspected.

The form is available as a fillable form at:

http://www.aphis.usda.gov/ppq/manuals/port/pdf_files/AQIM_in_PDF/Air_Cargo.pdf

Data Collection and Maintenance

Background

The movement of international cargo by aircraft can pose a significant exotic pest and disease risk to agriculture in the United States. The pathway "Air Cargo" encompasses all aspects of cargo movement into the United States by the use of various types of aircraft (cargo freighter, passenger aircraft, etc.). AQIM is designed to randomly sample air cargo shipments to determine the potential threat to agriculture.

Each work location will randomly sample air cargo arriving at that work location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location?
2. How effective is the AQI program at managing this threat?

The origin and destination of air cargo shipments is important to determine risk. Just as important is if the air cargo shipment carries an actual agriculture pest. While each work location will have different rates of quantity and variety of cargo, the same criteria for sampling will apply to all work locations. Through consistent random sampling a depiction of the pest threat of each type of cargo will emerge. Combined data from all work locations will help determine the pest risk posed by various air cargo items.

AQIM of air cargo shipments is an ongoing function and is an integral part of the AQI program. The ongoing sampling of air cargo shipments will allow work locations to adjust their selection criteria and will ultimately help accomplish our mission.

Agriculture Quarantine Activity Systems (AQAQ) User Guide for Data Entry

General Instructions

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for air cargo surveys provides a general answer for question 1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an agricultural pest approach the ports. Surveys show that at some ports about 1.5 percent of the cargo units carried actionable pests in the past year, while other work locations show rates as high as 10 percent.

These percentages are an approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with air cargo approaching the work location. The

origin and destination of the cargo are important to determine risk levels. Also, whether or not the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. The AQIM National Team is providing ports with a computer software tool, Epi Info, to help with these analyses. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some ports, teams of PPQ officers and managers form Risk Management Teams to look at monitoring data and other data, which is normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

The following questions are a guide for managers and Risk Management Teams to formulate information around. With the answers, valid decisions can be made based on the potential risk of quarantined material and exotic pests and diseases entering a specific pathway. The value of using the monitoring data for decision making is better understood.

1. How many air way bills were selected for sampling during the survey period?

   How many actions were required on air waybills sampled?

   How many actions by strata category sampled were there?

   What is the action approach rate of air waybills that require action (number of air waybills requiring action divided by total air waybills in the sample)? What are the action approach rates by strata category?

2. How many pest interceptions (actionable pests) were made from survey samples?

Pest Approach Rate: What is the rate of pest interceptions in relation to the total sampled number of air waybills (number of air waybills with actionable pests divided by total air waybills in the sample)?

3. Compare the rate of actions required for each month of the survey.

   DISCUSSION:

   Are there easily identified trends when the rate of QMI's transiting the work location are higher?

   Are there seasonal trends?

   Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

   Which commodities are most likely to require action? Where were the agricultural pests found? Which commodities involved solid wood packing (SWP) actions? What is the rate of air waybills with smuggled or mismanifested items?

   DISCUSSION:

   How effective is the current tailgate inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

   DISCUSSION:

   What selectivity factors are currently used to identify shipments likely to require action?

   What additional selectivity factors would be used to identify shipments likely to require action?

   Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place.

How many air waybills arrived at the port during the survey period? Using the action approach rate for air waybills requiring action, calculate an estimate of the number of air waybills transiting the work location that are likely to require action. What are the estimates per strata category?

Using WADS data, how does the estimated number of actions required compare with the reported number of actions taken?

How many additional actions may have been required during the survey period?

How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

DISCUSSION:

What percentage of resources are dedicated to staffing AQI activities for air cargo at the work location?

What is the relative risk of air cargo compared with other pathways in the work location?

Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?